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Automatic Control of Car Using Eye Blink, Air Blow And Mems Sensor and Home Security System Using Ir Sensors

Kiran.O.S[1] , MahalingaV Mandi[2]

PG student[1]

Associate Professor[2],

Dr. Ambedkar Institute of Technology,

Bengaluru.Bengaluru.

oskiran2@gmail.com[1], mvmandi@yahoo.com[2]

Abstract

This paper describes the design and implementation of a automatic remote controlled vehicle and smart home security system using embedded system.The main purpose of this paper is to help for physically challenged Person and aged person with several diseases such as spinal cord injury, muscular dystrophies, multiple sclerosis etc., who have difficulty in conveying their intension and communicating with other people in day to day life. In this paper a prototype is developed to help them by designing a automatic car controlled system with combination of several low cost sensors for vehicle controlling and home security system. In this paper we discuss the design and implementation of an intelligent remote controlled vehicle working on standard wireless sensor network i.e. ZIGBEE as a transceiver and not by the usual method of keypad for the physically handicapped people.In this work we are designing automatic remote control vehicle that can be controlled by combination of three sensors namely EYE BLINK,AIR BLOW by mouth, MEMS sensor and ZIGBEE as a standard-based home-area wireless network .AIR BLOW sensor is connected to person mouth to start the vehicle. MEMS sensors are based on hand movement of person fingers and it is used to change the direction vehicle towards right or left. EYE BLINK sensor used here to stop the vehicle that is connected person's eye. This implementation also has home security system for deaf and dumb. In the second section of this work an elderly person monitoring has been done. Since it is difficult to monitor elderly disable person for 24 hours, when we are out of home for any reason. If anyone enters to our home and during that time second section of this work is to be used to monitor from where person is entering to home, if person is entering from the door, receiver will receive the signal and message will be displayed that

from where person is entering to home and green light will be activated with vibrator, else if he is entering from window red light will be activated with vibrator and corresponding message will be displayed on LCD display. The method of transmitting and receiving data was done wirelessly using a ZigBee device.

Keywords: *Arm, Zig bee, Dc motors, Air blow Sensor, Mems Sensor*

INTRODUCTION

Today many organizations in the world are interested in the development of vehicles which could enable disabled people to enjoy a higher quality of life, and possibly function[1] - [13].There are many people in this world who are suffering from physical disability. The problems that a deaf, blinder disabled person encounter sat work are, attimes, insurmountable difficulties. Unfortunately the production of accessible facilities for disabled people in the workplace is often either very difficult or very expensive. Because of recent technological advances, the disabled could occupy many positions and could have their professional capacity reconsidered. Any contribution made by electronic systems to encourage the autonomy of the disabled at any stage should be thought of not as luxury, but as a necessity.Wireless Sensor Networks (WSNs) can be considered as a revolution in the field of data gathering and management. A lot of very vital applications can benefit from these networks to improve its performance and reach decisions based on realistic gathered information. Thus, a lot of applications can benefit from WSNs as habitat monitoring for gathering information about a plant or creature without irritating them to learn ideal natural conditions ideal for the verdure/fauna's development, military applications where WSNs can give continuous data of the adversary exercises to commando groups and in this way making coordination and arranging more powerful, savvy homes for systems administration different home apparatuses and overseeing them remotely. In this paper we utilize ZIGBEE as a remote sensor arranges which is accustomed to transmitting and getting information remotely.

The automatic remote controlled vehicle described in this paper is to help for physically challenged Person and aged person with several diseases such as spinal cord injury, muscular dystrophies, multiple sclerosis etc., which have difficulty in

conveying their intension and communicating with other people in day to day life. In this paper a prototype is developed to help them by designing a system with combination of several low cost sensors for vehicle controlling and home security system. In this work we are designing remote control vehicle that can be controlled by combination of three sensors namely EYE BLINK, AIR BLOW by mouth and MEMS sensor. AIR BLOW sensor is connected to person mouth to start the vehicle. MEMS sensors are based on hand movement of person fingers and it is used to change the direction vehicle towards right or left. EYE BLINK sensor used here to stop the vehicle that is connected person's eye.

This implementation also has home security system for deaf and dumb. In the second section of this work an elderly person monitoring has been done. Since it is difficult to monitor elderly disable person for 24 hours, when we are out of home for any reason. if anyone enters to our home and during that time second section of this work is to be used to monitor from where person is entering to home, if person is entering from the door, receiver will receive the signal and message will be displayed that from where person is entering to home and green light will be activated with vibrator, else if he is entering from window red light will be activated with vibrator and corresponding message will be displayed on LCD display.

The rest of this paper is organized as follows. Section II describes related work. Section III introduces the block diagram and description of the proposed work. Section IV discusses the software and hardware requirements. Section V presents the experimental results and Section VI reports conclusion and future work.

RELATED WORK

The capacity with move uninhibitedly will be exceptionally esteemed toward every last bit people. However, it is frequently troublesome for an individual with a physical handicap. Nowadays, those remote controlled vehicles will be economically accessible to handicapped people. Man for separate diseases, for example, such that spinal line injury, bulky dystrophies, different sclerosis etc, experience issues passing on their intentional What's more conveying for other people On Every day existence.

To empower a handicapped representative should drive a remote controlled vehicle securely and effortlessly. In This regard

scientists suggested a few remote control vehicles in the literature. In this paper a low cost solution is proposed to develop a remote controlled vehicle who are suffering from spinal cord injuries, muscular dystrophies etc. And a home security system for deaf and dumb.

An idea of remote controlled vehicle for physically disabled people and their operation was discussed in [1].To drive the vehicle safely and controlled by combination of three sensors namely AIR BLOW, MEMS and EYE BLINK sensor. The idea of using EYE BLINK sensor for disabled people was showed in [2].In this paper[2] an eye blink sensor will sense the drowsiness and as soon a eye is closed the car will be stopped as showed.

MEMS based remote controlled vehicle was examined in [3] and the sensor is utilized to build up a vehicle which controls its development by bowing a man's fingers. MEMS sensors are inserted into hand glove to accomplish the wanted objective. The MEMS sensors inside the glove can detect the development of fingers. The controller (ARM7) sends the signs to the recipient segment which is put under the wheelchair through a remote innovation. In the collector area get the signs from the transmitter as indicated by the signs the engine is running which changes the wheel development. Design of remote control based power wheel chair for person with several disabilities such as multiple sclerosis, high level spinal cord injuries, muscular dystrophies, brain injury etc.. is presented in [4]. Combination of microprocessors/computers and sensors that assist or completely assume control of power wheel chair system is discussed.An electric wheel chair control using head pose free eye-gaze estimation. he showed that the vehicle is controlled by using eye gaze estimation system is shown in [5].The system includes 3D orientation sensor to take into account the head pose. Therefore user can change his head or pose using his or her pose with comfort during navigation.In [6]a novel system for regulating those developments of a vehicle In light of those hand gestures is presented.Here one set of IR sensors and person ultra nationalistic sensors are used to feeling the hand gestures.

A smart home applications for physically disabled people especially for those who suffering from deaf,Alzeimer disease etc. And development of automatic door control system for those people who do not have arms or hands is presented in [7].The system recognizes the person who approaches to the door, then decides to

open or not open the door according to identity of person.The second actuation is for deaf people, When deaf people are at home, they are not aware of any sound such as doorbell and gas leaking warning alarm. This project enables to make aware of deaf person by vibrating the device that is carried by person when something happened to warn him or her. The third and last actuation is for Alzheimer diseased people. The principle issue for Alzheimer sick individuals is that they overlook what they are doing. For instance, when they cook, they can overlook the gas open and leave the kitchen. On the off chance that the gas begins releasing, shrewd home framework recognizes that then caution individual with sound, cautioning message and vibration. All correspondence is overseen by Wireless Sensor Network (WSN).

BLOCK DIAGRAM AND DESCRIPTION OF THE PROPOSED WORK

Description

The Block diagram of this work consists of two sections, first section is used for the person suffering from spinal cord injury and hand injury, and for such persons it is difficult to drive the vehicle as shown in Fig 1. In this section air blow sensor, eye blink and mems sensor are used to control the car, Blow sensor is used to start the car, to change the direction of the vehicle mems technology is used to change the direction towards right or left and eye blink sensor will sense the drowsiness, as soon a eye of the driver is closed the car will be stopped.

PERSON SIDE

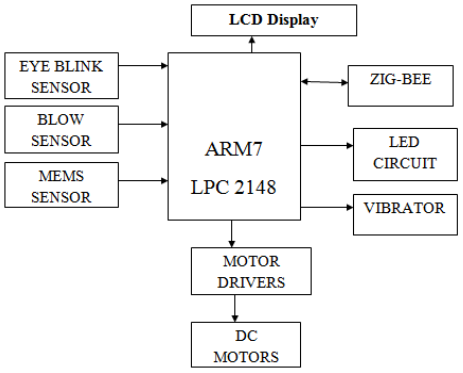

Fig 1.*Automatic Remote controlled vehicle for physically disabled people*

In the second section of this work an elderly person monitoring has been done. Since it is difficult to monitor elderly disable person for 24 hours, when we are out of home for any reason. if anyone enters to our home and during that time second section of this work as shown in Fig 2 is to be used to monitor from where person is entering to home, if person is entering from the door, receiver will receive the signal and message will be displayed that from where person is entering to home and green light will be

activated with vibrator, else if he is entering from window red light will be activated with vibrator and corresponding message will be displayed on LCD display.

DOOR SIDE

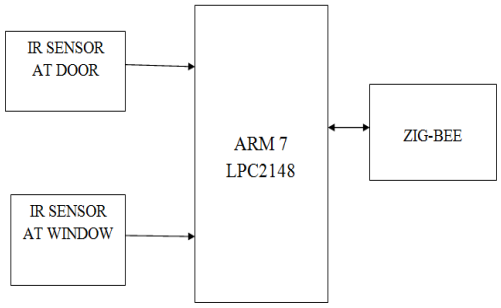

Fig2*.Home security system for deaf and dumb people*

HARDWARE AND SOFTWARE REQUIREMENTS

Hardware and software tools required for proposed method is as follows:

HARDWARE REQUIREMENTS

LPC2148 Microcontroller/PIC16F877A,INFRARED SENSORS,MEMS SENSOR,MQ3/MQ7(AIRBLOW SENSORS),EYEBLINKSENSOR,LCDDISPLAY, VIBRATOR,ZIGBEE and INDICATING LEDS.

The important features of these Hardware requirements are discussed in brief.

LPC2148 Microcontroller

LPC2148 is the generally utilized IC from ARM-7 family. It is produced by Philips and it is pre-stacked with numerous inbuilt peripherals making it more effective and a solid choice for the novices and additionally top of the line application designer. Because of their little size and low power utilization, LPC2148 are perfect for applications where scaling down is a key prerequisite, for example, get to control and purpose of-offer. Serial interchanges interfaces going from a USB 2.0 Full-speed gadget, different UARTs, SPI, SSP to I2C-transport and on-chip SRAM of 8 kB up to 40 kB, make these gadgets exceptionally appropriate for correspondence doors and convention converters, delicate modems, voice acknowledgment and low end imaging, giving both extensive support size and high handling power.

INFRARED SENSOR(IR SENSOR)

This device uses IR sensor modules which here act as proximity sensors. It has a pair of IR transmitter and IR receiver and an on-board LED indicator. When IR signals are received by IR receiver a voltage will be generated due to photovoltaic effect and the output goes high. Hence the output pin is normally low though the IR LED is

continuously transmitting as there is no obstacle and nothing is reflected back to the IR receiver. When an obstacle is encountered, the output of IR receiver goes high as IR signal is reflected from the obstacle surface. This drives the output and the on-board LED to high.

MEMS SENSOR

The system uses MEMS sensors to change the direction vehicle. The MEMS sensor based on hand-moment of the person's fingers'MEMS sensors' are embedded into a hand glove in order to achieve the desired goal. The MEMS sensors inside the glove can detect the development of fingers. The controller sends the signs to the collector area which is set under the vehicle through a remote innovation. In The collector segment get the signs from the transmitter as indicated by the signs the engine is running which changes the vehicle development.

AIRBLOW SENSOR (MQ3/MQ7)

The system uses AIRBLOW SENSOR to start the vehicle. This sensor is also called MQ3/MQ7 SENSOR. This sensor is connected to controller.

EYEBLINK SENSOR

The system uses EYEBLINK SENSOR to stop the vehicle. EYEBLINK sensor will sense the drowsiness; as soon as eye is closed the car will be stopped.

ZIGBEE

ZIGBEE is a cost-effective, standard-based home-area wireless network, designed specifically to replace the proliferation of individual remote controls, and supports low data rates, low power consumption, security, and reliability. The system uses ZIGBEE as a transceiver i.e transmitter and receiver.

MOTOR DRIVERS

An engine controller is a gadget alternately gathering of gadgets that serves with oversee done a portion foreordained way the execution about an electric engine.An engine controller could incorporate a manual alternately programmed implies to beginning Furthermore ceasing the motor, selecting ahead or reverse rotation, selecting What's more directing those speed, directing alternately restricting the torque, Furthermore ensuring against overloads What's more faults.

DC MOTORS

The project uses DC motor and it can hold any position from 0 to 180 degree. The purpose of the DC motor in the project is to monitor a vast area in a quick manner.

The motors used in the wheels are 160 Rpm that makes the vehicle to perform fast movements and it needs a supply of 12v. The arm of the remote vehicle consists of 9v DC motor and the Rpm of it is 60 which can be used to lift up the objects slowly and to avoid accidents.

SOFTWARE REQUIREMENTS:

KEIL IDE/MPLAB for developing micro controller code, FLASH MAGIC for dumping the hex file in to controller.

The important features of these Software requirements are discussed in brief.

KEIL IDE

The µ Vision IDE is a window-based software development platform combining a robust editor, Project Manager, and Make Utility tool. M Vision supports all the Kiel tools including C/C++ Compiler, Macro Assembler, Linker, Library Manager, and Object-HEX Converter.

FLASHMAGIC

This software is used for dumping hex file into the controller.

RESULTS AND DISCUSSION

SIMULATION RESULTS FOR PHYSICALLY DISABLED PEOPLE (SPINAL CORD INJURIES, HAND INJURY etc...)

Fig3 shows the screen shot view of vehicle moving in forward direction. The system uses MEMS sensor to change the direction of vehicle. If the vehicle is moving in forward direction the output of the system will be seen as a vehicle moving in forward direction. Here we use FLASH MAGIC for dumping the hex file in to controller. Here X axis value after simulation is 1023.00000.

Fig3.*screen shot of vehicle moving in forward direction*

Fig4 shows the screen shot view of vehicle moving in right direction. Here MEMS sensor is used to change the vehicle moving in right direction .if the vehicle is moving in right direction the output of the system will be seen as a vehicle moving in right direction. Here we use FLASH MAGIC for dumping the hex file in to

controller. Here X axis value after simulation is 1023.00000.

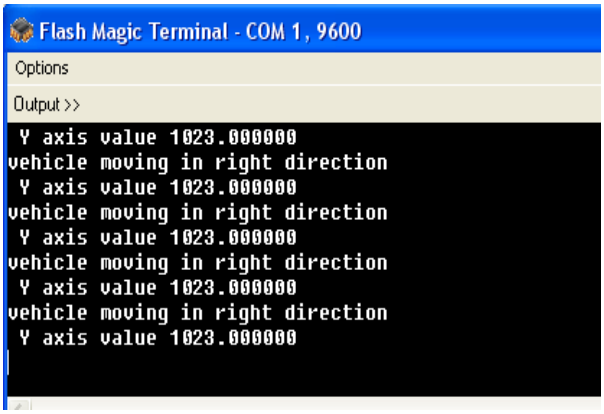

Fig4.*screen shot of vehicle moving in right direction*

Fig5 shows the screen shot view of vehicle moving in left direction. Here MEMS sensor is used to change the vehicle moving in left direction. if the vehicle is moving in right direction the output of the system will be seen as a vehicle moving in left direction. Here we use FLASH MAGIC for dumping the hex file in to controller. Here X axis value after simulation is 1023.00000.

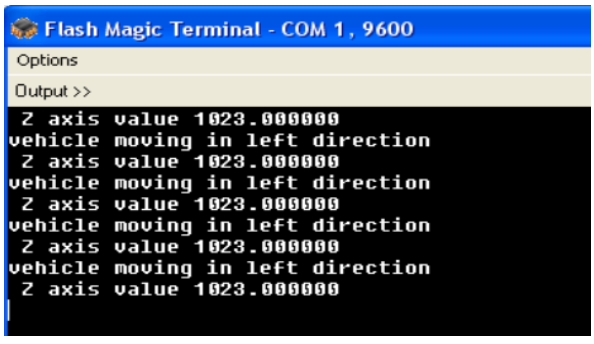

Fig5.*screen shot of vehicle moving in left direction*

Fig6 shows the screen shot view of vehicle moving is stopped. Here EYE BLINK sensor is used to stop the vehicle. as soon as eye is closed the car will be stopped. The output of the system shows vehicle is stopped. Here we use FLASH MAGIC for dumping the hex file in to controller.

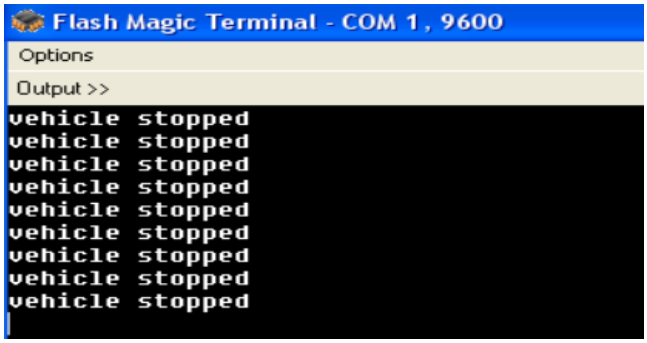

Fig6.*screen shot of vehicle moving is stopped*

SIMULATION RESULTS FOR HOME SECURITY SYSTEM (for deaf and dumb people)

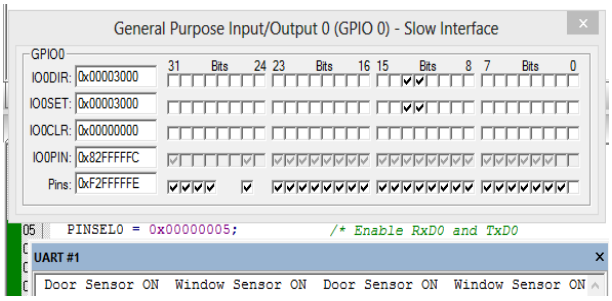

Fig7*. screen shot for home security system for deaf and dumb people*

Fig7 shows the screen shot view of home security system. These results are related to

physically disabled people who are suffering from deaf and dumb. The result of this system can seen in serial window. here we use UART as a serial window.when person entering from door side receiver will receive the signal and message will be displayed that from where person is entering to home and green light will be activated with vibrator, else if he is entering from window red light will be activated with vibrator corresponding message will be displayed on LCD display.

CONCLUSION AND FUTURE WORK

In this paper we are designing automatic remote controlled vehicle (person who are suffering from spinal cord injury,muscular dystrophies etc..) that can be controlled by combination of three sensors namely EYE BLINK,AIR BLOW by mouth and MEMS sensor. AIR BLOW sensor is connected to person mouth to start the vehicle. MEMS sensors are based on hand movement of person fingers and it is used to change the direction vehicle towards right or left. EYE BLINK sensor used here to stop the vehicle that is connected person's eye.

In the second section of this work we are designing a home security system for deaf and dumb. Since it is difficult to monitor such disabled person for 24 hours, when we are out of home for any reason. if anyone enters to our home and during that time second section of this work is to be used to monitor from where person is entering to home, if person is entering from the door, receiver will receive the signal and message will be displayed that from where person is entering to home and green light will be activated with vibrator, else if he is entering from window red light will be activated with vibrator and corresponding message will be displayed on LCD display.

The prototype of the proposed system is designed and implemented on the specified Hardware.The proposed system is also tested or verified using keil software.

In the future scope the design can be improved by implementing the remote controlled vehicle by using wireless communication techniques like GSM modem, Bluetooth etc..

REFERENCES

1. GundaGautham,Gunda Sumanth ,Karthikeyan K C,Shyam Sundar, D Venkataraman, Eye Movement Based Electronic Wheel Chair For Physically Challenged Persons, VOLUME 3, ISSUE 2, FEBRUARY 2014.

2. DjokoPurwanto, Ronny Mardiyanto, Kohei Arai, _Electric wheelchair control with gaze direction and eye blinking', Artif Life Robotics, 14:397–400, May 18, 2009.
3. Dr.Shaik Meeravali, M. Aparna, "Design and Development of a Hand-glove Controlled Wheel Chair Based on MEMS", 2013.
4. Linda Fehr, W. Edwin Langbein, Steven B .Skaar,_ Adequacy of power wheelchair Control interfaces for the person with several disabilities, Vol . 37 No . 3, May/June 2000.
5. Q.X. Nguyen and S. Jo, _Electric wheelchair control using head pose free eye-gaze tracker', Electronics Letters, Vol. 48 No. 13, 21st June 2012.
6. Arun Prasad, Gani Bhavana, N. Sangeetha Sudha, Pratyush Gudla, K.P Peeyush, "GESTURE BASED TOUCHLESS JOYPAD", 2014.
7. Ali HaktanIsilake, "Smart Home Applications
8. for Disabled People by Using Wireless Sensor
9. Network." 2010.
10. Rory A. Cooper, _Intelligent Control of Power Wheelchairs', IEEE Engineering in medicine and Biology, 0739-51 75/95.
11. Rinard et al.,Method and Apparatus for monitoring the position of the eye', United States Patent, 4,145,122, Mar. 20, 1979.
12. Kohei Arai, Ronny Mardiyanto "Eyes Based Electric Wheel Chair Control System" (IJACSA) International Journal of Advanced Computer Science and Applications, Vol. 2, No. 12, 2011.
13. Simon P. Levine, David A. Bell, Lincoln A. Jaros, Richard C. Simpson, YoramKoren, "The NavChair Assistive WheelchairNavigation System" IEEE Transactions OnRehabilitation Engineering, Vol. 7, No. 4, December 1999
14. Gang Pan, Jiahui Wu, Daqing Zhang, ZhaohuiWu,Yingchun Yang, Shijian Li,"GeeAir: A universal multimodal remote control device for home appliances",SpringerVerlag London Limited 2010,10 March 2010.
15. S. Ahmad, M.O. Tokhi, "Forward and backward motion control of wheelchair on two wheels", Industrial Electronics and Applications, 2008. ICIEA 2008. 3rd IEEE Conference on, pp. 461 - 466, 01 August 2008.